

MICROPROCESSOR AND CONTROLLERS LAB

(Core Subject)

Course Code:	10B17CI407	Semester:	4th Semester, B. Tech (CSE) 5th semester, B.Tech (ECE)
Credits:	1	Contact Hours:	L-0, T-0, P-2

Course Objectives

At the conclusion of the course, following learning objectives are expected to be achieved. The lab work and homework portions of the course are intended to help you apply your understanding,

1. To develop, implement, and debug 8086 assembly language programs that meet stated specifications.
2. To understand and be able to explain bus transactions, memory organization and address decoding, basic I/O interfaces and port addressing.
3. To get familiarize with interfacing of various peripheral devices with the microprocessor
4. To control the components of a microprocessor based system through the use of interrupts.
5. To develop, implement, and debug 8051 assembly language programs and I/O interfaces that meet stated specifications.
6. to lay a foundation for pursuing some additional career options

Course Outcomes

After studying this course the students would gain enough knowledge

1. To increase proficiency in using assembly language to develop microprocessor based applications
2. To learn to control components of a microprocessor based system though the use of interrupts.
3. Gain practical experience in programming memory and peripheral devices like timers/counters, parallel peripheral devices, serial communication interfaces and I/O devices
4. To gain practical experience in programming with coprocessor and DMA controller
5. To work with 8051 microcontroller and interfaces like digital to analogue converters and analogue to digital converters etc.
6. To develop a microprocessor/microcontroller based system, using assembly language programming concepts, for handling a real life task

List of Experiments

Exp. 1 To get familiar with ET-8086LCD kit and its commands

Activity 1: Basic introduction of ET-8086LCD kit's component.

Activity 2: To get familiar with common monitor commands:

- (i) S: Substitute Memory, I/O, Register
- (ii) E: Expand Monitor (Assembler)
- (iii) G: Execute Machine Code (Go To)
- (iv) M: Move a block of data from one memory location to other
- (v) C: Compare a block of data on a memory location

Exp.2 Data transfer and Arithmetic operations

Activity 1. Write a programme starting from the memory location 1000:1000H to move a 16bit data to AX register and then move the data to the memory location 1000:0000H

Activity 2. Write a programme to add, subtract, multiply and divide two 16bit nos. stored at locations 1000:0000H and 1000:0002H. Store the result starting from 1000:0004H

Note: Find out the total memory used and machine cycles required for the programs.

Exp.3 Branch/Loop instructions and string instructions

Activity 1. Write memory efficient and time efficient programs to find the largest and smallest nos. in a string of 10 bytes, stored at location starting from 1000:0100H. Store the result at 1000:0200H and 1000:0201H

Activity 2. Write memory efficient and time efficient programs to sort a string of 10 bytes stored at location starting from 1000:0300H in ascending and descending order.

Exp. 4 Interrupts

Activity 1. Write a program to display the current time on the LCD in 24Hr format

Activity 2. Write a program to display three names successively on the LCD with a delay

Exp. 5 Keyboard and LCD display interfacing

Activity 1. Convert Fahrenheit to Celsius and display on the LCD

Activity 2. To check for palindrome in the given string

Exp. 6 On-board interfaces 8255, 8253, 8259

Write a program to output 55H and AAH repeatedly with a delay of 1sec at a port of 8255 using 8253 for delay and 8259 for interrupt.

Exp. 7 Serial communication interface 8251

Communicate between two microprocessor kits using serial communication interface 8251 and estimate the minimum time to transmit 10 characters.

Exp.8 Coprocessor 8087

Find the logarithm of a number using Math coprocessor 8087 and compare its execution time with 8086.

Exp. 9 DMA controller 8089 for high speed data transfer.

Write a program to transfer data from peripheral to Memory through DMA controller 8089

Exp. 10 Working with BIOS and DOS interrupts

Write a program to create a file 'myfile.txt' and write your bio-data in it. Save the file into the sub directory MYDIR. Read and display the contents of the file.

Exp.11 8051 programming

Activity 1. Familiarize with the 8051 kit

Activity 2. Acquire analog voltage signal from ADC and process it by removing noise using average filter. Output the filtered signal in analogue form using DAC.

Exp. 12 Mini project

Select any project of your choice

Evaluation Scheme

1. Mid Sem Evaluation	20 Marks
2. End Sem Evaluation	20 Marks
3. Attendance	15 Marks
4. Class response	30 Marks
5. File	15 Marks
Total Marks	100 Marks

Text Books

1. "The Intel Microprocessor 80x86, Pentium, Pentium Pro processor, Pentium II Pentium III, Pentium IV Architecture, Programming, and Interfacing " by **Berry B.Brey**, Eighth Edition, Prentice Hall, 2003
2. "The 8051 microcontroller" by Kenneth Ayala is recommended for 8051 only
3. "Microprocessors & Interfacing, Programming & Hardware", by Douglas Hall, 2nd Edn. Tata McGraw Hill.